

Pending Claims

The listing of claims will replace all prior versions, and listings of claims in the application.

1-12. (Canceled)

13. (Previously Presented) A ball grid array (BGA) package, comprising:

a substrate having a plurality of contact pads on a first surface electrically connected through said substrate to a plurality of solder ball pads on a second surface of said substrate;

an integrated circuit (IC) die that is mounted to said first surface of said substrate;

a heat spreader that has a first surface and a second surface, wherein said first surface of said heat spreader is attached to said second surface of said substrate by an adhesive between said heat spreader and said substrate; and

a ring shaped stiffener being centrally open in a first surface and a second surface, wherein said first surface of said ring shaped stiffener is attached to said first surface of said substrate;

wherein said second surface of said heat spreader is capable of being coupled to a printed circuit board (PCB);

wherein said IC die is mounted to said first surface of said substrate in a flip chip configuration, wherein a conductive bump on an active surface of said IC die is connected to a conductive pad on said first surface of said substrate.

14-15. (Canceled)

16. (Previously Presented) The package of claim 13, further comprising:

a second heat spreader attached to a non-active surface of said IC die and said second surface of said ring shaped stiffener.

17. (Previously Presented) The package of claim 13, further comprising a via located proximate to said mounted IC die that extends through said substrate from said first surface of said substrate to said second surface of said substrate, wherein said via is filled with a conductive material to couple said conductive bump to said heat spreader.

18-51. (Canceled)

52. (Previously Presented) The package of claim 16, wherein said second heat spreader is attached to said second surface of said ring shaped stiffener with a thermally conductive adhesive material.

53. (Previously Presented) The package of claim 16, wherein said second heat spreader is attached to said non-active surface of said IC die with a thermally conductive adhesive material.

54. (Previously Presented) The package of claim 16, wherein said second heat spreader comprises at least one metal.

55. (Previously Presented) The package of claim 54, wherein said at least one metal includes copper.

56. (Previously Presented) The package of claim 54, wherein said at least one metal includes aluminum.

57. (Previously Presented) The package of claim 16, wherein said second heat spreader is substantially planar.

58. (Previously Presented) The package of claim 17, wherein said conductive material filling said via thermally couples said conductive bump to said heat spreader.

59. (Previously Presented) The package of claim 17, wherein said conductive material filling said via electrically couples said conductive bump to said heat spreader.

60-68. (Canceled)

69. (Previously Presented) The package of claim 13, wherein an outer profile of said heat spreader overlaps with an inner profile of said ring shaped stiffener.

70. (Previously Presented) The package of claim 13, wherein said second surface of said heat spreader is plated with solder that allows said second surface of said heat spreader to be surface mounted to soldering pads on the PCB.

71. (Previously Presented) A ball grid array (BGA) package, comprising:

- a substrate having a plurality of contact pads on a first surface electrically connected through said substrate to a plurality of solder ball pads on a second surface of said substrate;
- an integrated circuit (IC) die that is mounted to said first surface of said substrate;
- a heat spreader that has a first surface and a second surface, wherein said first surface of said heat spreader is attached to said second surface of said substrate; and
- a ring shaped stiffener being centrally open in a first surface and a second surface, wherein said first surface of said ring shaped stiffener is attached to said first surface of said substrate;

wherein said second surface of said heat spreader is capable of being coupled to a printed circuit board (PCB);

wherein said IC die is mounted to said first surface of said substrate in a flip chip configuration, wherein a conductive bump on an active surface of said IC die is connected to a conductive pad on said first surface of said substrate; and

wherein said second surface of said heat spreader is plated with solder that allows said second surface of said heat spreader to be surface mounted to soldering pads on the PCB.